CLAIMS

We claim:

1. An isolated polynucleotide molecule encoding a fibroblast growth factor (FGF) homolog comprising a polynucleotide sequence that encodes for a polypeptide that is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 55 (Tyr) to amino acid residue 175 (Met).

2. The isolated polynucleotide molecule of claim 1, wherein said polynucleotide sequence encodes for a polypeptide that is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from residue 55 (Tyr) to residue 196 (Lys).

3. The isolated polynucleotide molecule of claim 1, wherein said polynucleotide sequence encodes for a polypeptide that is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from residue 55 (Tyr) to residue 207 (Ala).

4. An isolated polynucleotide molecule encoding a fibroblast growth factor (FGF) homolog comprising a polynucleotide sequence that encodes for a polypeptide that is at least 60% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to 175 (Met).

5. The isolated polynucleotide molecule of claim 4, wherein said polypeptide encoded by said polynucleotide is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 175 (Met).

6. The isolated polynucleotide molecule of claim 4, wherein said polypeptide encoded by said polynucleotide is

at least 90% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 175 (Met).

7. An isolated polynucleotide molecule encoding an FGF homolog comprising a polynucleotide sequence that encodes a polypeptide that is at least 60% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 196 (Lys).

8. The isolated polynucleotide molecule of claim 7, wherein said polypeptide encoded by said polynucleotide is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 196 (Lys).

9. The isolated polynucleotide molecule of claim 7, wherein said polypeptide encoded by said polynucleotide is at least 90% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 196 (Lys).

10. An isolated polynucleotide molecule encoding an FGF homolog comprising a polynucleotide sequence that encodes a polypeptide that is at least 60% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 207 (Ala).

11. The isolated polynucleotide molecule of claim 10, wherein said polypeptide encoded by said polynucleotide is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 207 (Ala).

12. The isolated polynucleotide molecule of claim 10, wherein said polypeptide encoded by said polynucleotide is at least 90% identical to the amino acid sequence as shown in

SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 207 (Ala).

13. An isolated polynucleotide molecule encoding an FGF homolog comprising a nucleotide sequence as shown in SEQ ID NO: 1 from nucleotide 163 to nucleotide 525 or as shown in SEQ ID NO: 6 from nucleotide 163 to nucleotide 525.

14. The isolated polynucleotide of claim 13, wherein said polynucleotide comprises a polynucleotide sequence as shown in SEQ ID NO: 1 from nucleotide 82 to nucleotide 525 or as shown in SEQ ID NO: 6 from nucleotide 82 to nucleotide 525.

15. The isolated polynucleotide of claim 13, wherein said polynucleotide comprises a polynucleotide sequence as shown in SEQ ID NO: 1 from nucleotide 82 to nucleotide 588 or as shown in SEQ ID NO: 6 from nucleotide 82 to nucleotide 588.

16. An expression vector comprising the following operably linked elements:

a transcription promoter;

a DNA segment selected from the group consisting of:

(a) an isolated polynucleotide molecule encoding an FGF homolog comprising a polynucleotide sequence as shown in SEQ ID NO: 1 from nucleotide 163 to nucleotide 525 or as shown in SEQ ID NO: 6 from nucleotide 163 to nucleotide 525;

(b) an isolated polynucleotide molecule encoding an FGF homolog comprising a polynucleotide sequence as shown in SEQ ID NO: 1 from nucleotide 82 to nucleotide 525 or as shown in SEQ ID NO: 6 from nucleotide 82 to nucleotide 525;

(c) an isolated polynucleotide molecule encoding a fibroblast growth factor (FGF) homolog comprising a polynucleotide sequence that encodes for a polypeptide that is at least 80% identical to the amino acid sequence as shown in

SEQ ID NO: 2 from amino acid residue 55 (Tyr) to amino acid residue 175 (Met); and

(d) an isolated polynucleotide molecule encoding a fibroblast growth factor (FGF) homolog comprising a polynucleotide sequence that encodes for a polypeptide that is at least 60% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to 175 (Met); and

a transcription terminator.

17. A cultured cell into which has been introduced an expression vector according to claim 16, wherein said cell expresses a polypeptide encoded by the DNA segment.

18. A method of producing an FGF homolog polypeptide comprising:

culturing a cell into which has been introduced an expression vector according to claim 16, whereby said cell expresses an FGF homolog polypeptide encoded by the DNA segment; and

recovering the FGF homolog polypeptide.

19. An isolated FGF homolog polypeptide comprising an amino acid sequence that is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 55 (Tyr) to amino acid residue 175 (Met).

20. An isolated FGF homolog polypeptide comprising an amino acid sequence that is at least 60 % identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 175 (Met).

21. The polypeptide of claim 20, wherein said polypeptide is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 175 (Met).

22. The polypeptide of claim 20, wherein said polypeptide is at least 90% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 175 (Met).

23. An isolated FGF homolog polypeptide comprising an amino acid sequence that is at least 60 % identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 196 (Lys).

24. The polypeptide of claim 23, wherein said polypeptide is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 196 (Lys).

25. The polypeptide of claim 23, wherein said polypeptide is at least 90% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to amino acid residue (Lys).

26. An isolated FGF homolog polypeptide comprising an amino acid sequence that is at least 60 % identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 207 (Ala).

27. The isolated polypeptide of claim 26, wherein said polypeptide is at least 80% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 207 (Ala).

28. The isolated polypeptide of claim 26, wherein said polypeptide is at least 90% identical to the amino acid sequence as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 207 (Ala).

29. The polypeptide of claim 20, wherein said polypeptide comprises a secretory signal sequence.

30. The polypeptide of claim 29, wherein said secretory signal sequence comprises the amino acid sequence of SEQ ID NO: 2 from amino acid residue 1 (Met) to residue 27 (Ala).

31. A pharmaceutical composition comprising a purified FGF homolog polypeptide according to claim 20, in combination with a pharmaceutically acceptable vehicle.

32. A fusion protein comprising a first portion and a second portion, joined by a peptide bond, said first portion comprises a maltose binding protein, and a second portion comprising an FGF homolog polypeptide as shown in SEQ ID NO: 2 from amino acid residues 28-207.

33. The fusion protein of claim 32, wherein the peptide bond is selected from the group consisting of Factor Xa cleavage site, thrombin cleavage site or enterokinase cleavage site.

34. A method for expanding mesenchymal cell populations comprising administering an FGF homolog polypeptide as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 175 (Met), wherein said polypeptide increases the number of cells as compared to cell populations wherein the polypeptide is not administered.

35. The method of claim 34, wherein the mesenchymal cell population is selected from the group consisting of: cardiac myocytes, skeletal myocytes, fibroblasts, osteoblasts and pluripotent stem cells.

36. A method for improving cardiac performance in a patient in need thereof by administering a therapeutically sufficient amount of an FGF homolog polypeptide as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to residue 175 (Met), wherein administration of said polypeptide results in a clinically significant improvement in cardiac performance.

37. The method of claim 37, wherein the clinically significant improvement in cardiac performance is selected from the group consisting of:

(a) an increase in total ejection fraction;

(b) a decrease in end-diastolic pressure;

(c) an increase in dP/dt; and

(d) a decrease vascular resistance.

38. The method of claim 37, wherein the clinically significant improvement in cardiac function is an increase in total ejection fraction.

39. A method for increasing cardiac performance in an individual comprising:

administering to said individual an effective amount of a composition comprising a polynucleotide encoding an FGF homolog as shown in SEQ ID NO: 2 from amino acid residue 28 (Glu) to amino acid residue 175 (Met), wherein upon expression in a target tissue said polynucleotide improves cardiac performance.